



# The Role of Economics in Emerging Infectious Diseases

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# Emerging Infectious Diseases

- ◆ Newly recognized diseases
  - HIV, Ebola
- ◆ Diseases transmitted in new ways
  - Tissue transplants and transmission of Chagas
  - Bioterrorist release of smallpox virus
- ◆ Diseases with new public health solutions
  - Lymphatic Filariasis



# What are the Roles for Economists with EID?

- ◆ Evaluate the potential economic impact
- ◆ Forecast potential resource requirements
- ◆ Evaluate the cost-effectiveness of interventions



# Evaluate the Potential Impact

- ◆ Model impact of alternative disease transmission scenarios
- ◆ Model potential economic impact over time
- ◆ Compare with existing public health problems



# Forecast Resource Requirements

- ◆ Predict impact on health care system
  - Drug supply
  - Hospital beds
  - Emergency care
- ◆ Identify resource needs for new public health programs



# Evaluate Cost Effectiveness

- ◆ Estimate costs to counter new means of emergence
- ◆ Estimate potential effectiveness
- ◆ Calculate cost effectiveness compared to other interventions



# Challenge # 1: Measuring Burden

- ◆ Emerging diseases rarely have adequate data
  - Prevalence
  - Impact
- ◆ Infectious disease studies require complex transmission models



# Challenge #2: Estimating Cost Effectiveness

- ◆ Strategies have unknown effectiveness
  - Often too new to have been evaluated
- ◆ Only intermediate outcomes are available
  - Long term data rarely available
- ◆ Transmission, transmission, transmission
  - Mode
  - Infectivity
  - Etc.





# Example: The Lymphatic Filariasis Experience

- ◆ Old disease
- ◆ Widespread
  - 80 countries
  - 120 m infected
- ◆ New solutions
- ◆ New global effort to eliminate



# Roles for Economic Information in LF Campaign

- ◆ Advocacy
- ◆ Planning
- ◆ Program Accountability



# Audiences

- ◆ Donors
- ◆ Implementing organizations
- ◆ Countries
- ◆ Communities



# Advocacy

- ◆ Describe economic burden of disease
- ◆ Demonstrate positive returns on investment in disease prevention programs
- ◆ Show community demand for programs
- ◆ Demonstrate impact of investment on health infrastructure and on economic development



# Example: Impact on Productivity

- ◆ In India, LF causes almost \$1 billion a year in lost productivity (Ramaiah)
- ◆ In Africa, LF causes almost \$2 billion in losses (Haddix)



# Example: Medical Costs

- ◆ In India, over 10 million people seek treatment each year costing over \$30 million (Ramaiah)
- ◆ A district hospital in Tanzania reports 15% of major surgeries are for hydrocele (Wegesa)
- ◆ In a hospital in Northern Ghana 25% of all surgeries are for hydrocele (Gyapong)



# Planning and Evaluation

- ◆ Cost analyses
- ◆ Cost effectiveness analyses
- ◆ Outcomes research
- ◆ Technical assistance



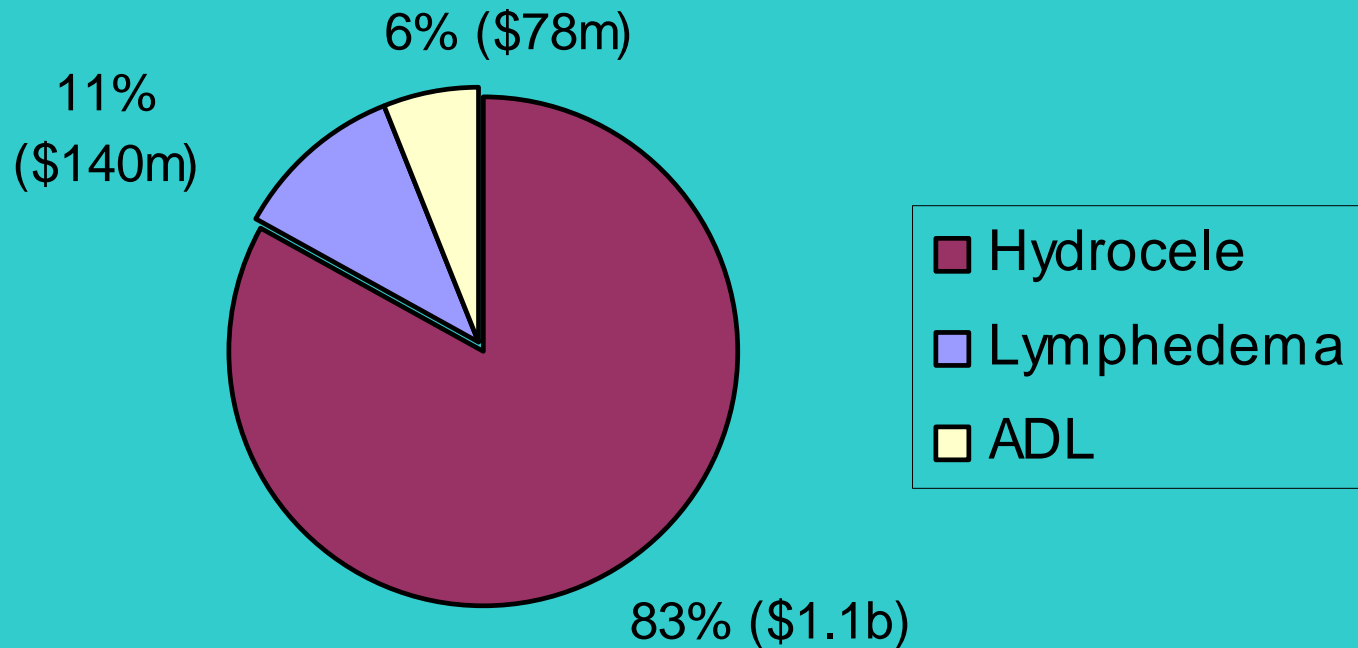
# Example: African LF Model

- ◆ Modeled cost and impact of a proposed African LF program
- ◆ Examined effects on disability and productivity over a 30 year period

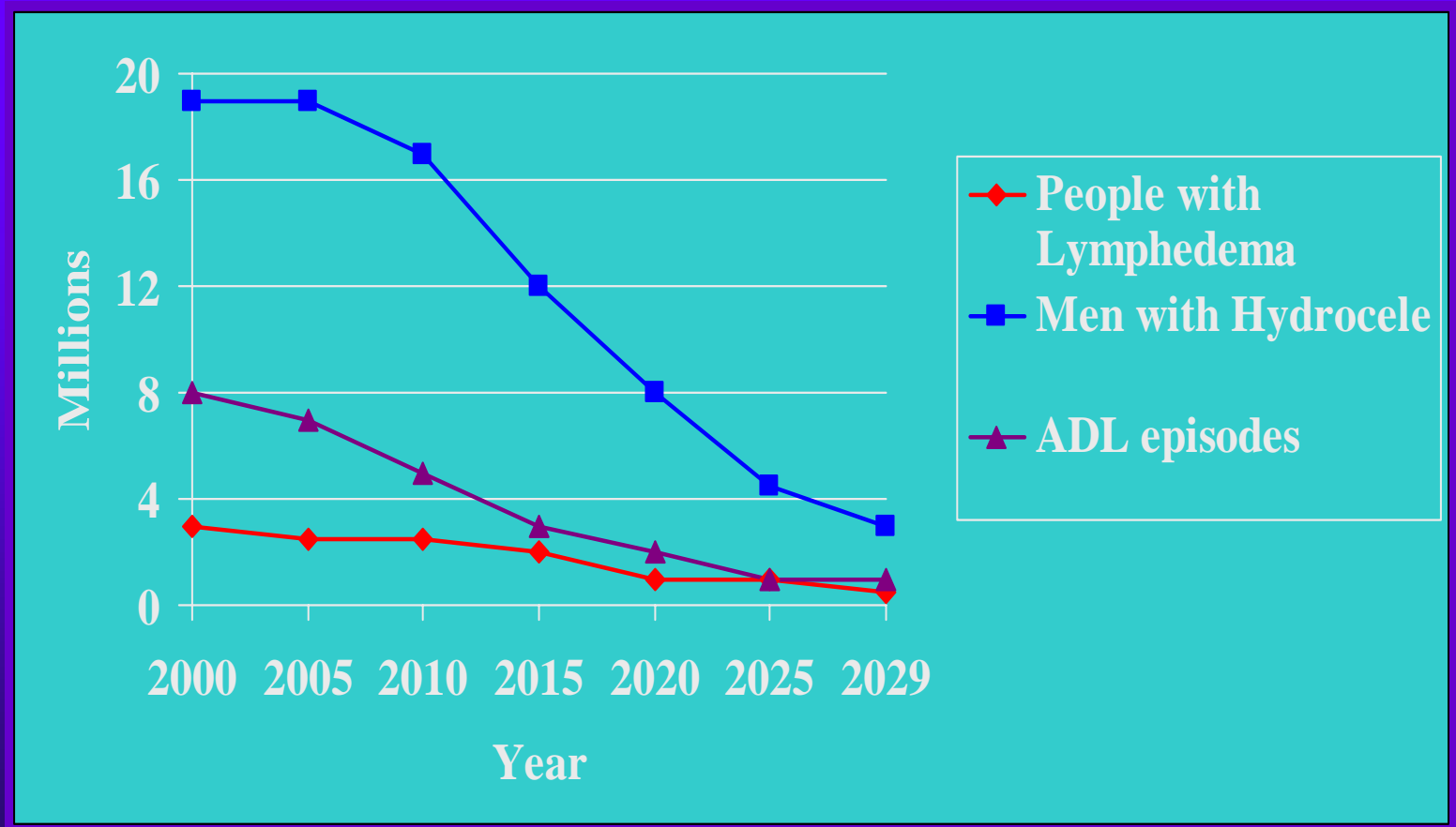


# Productivity Losses by LF Condition

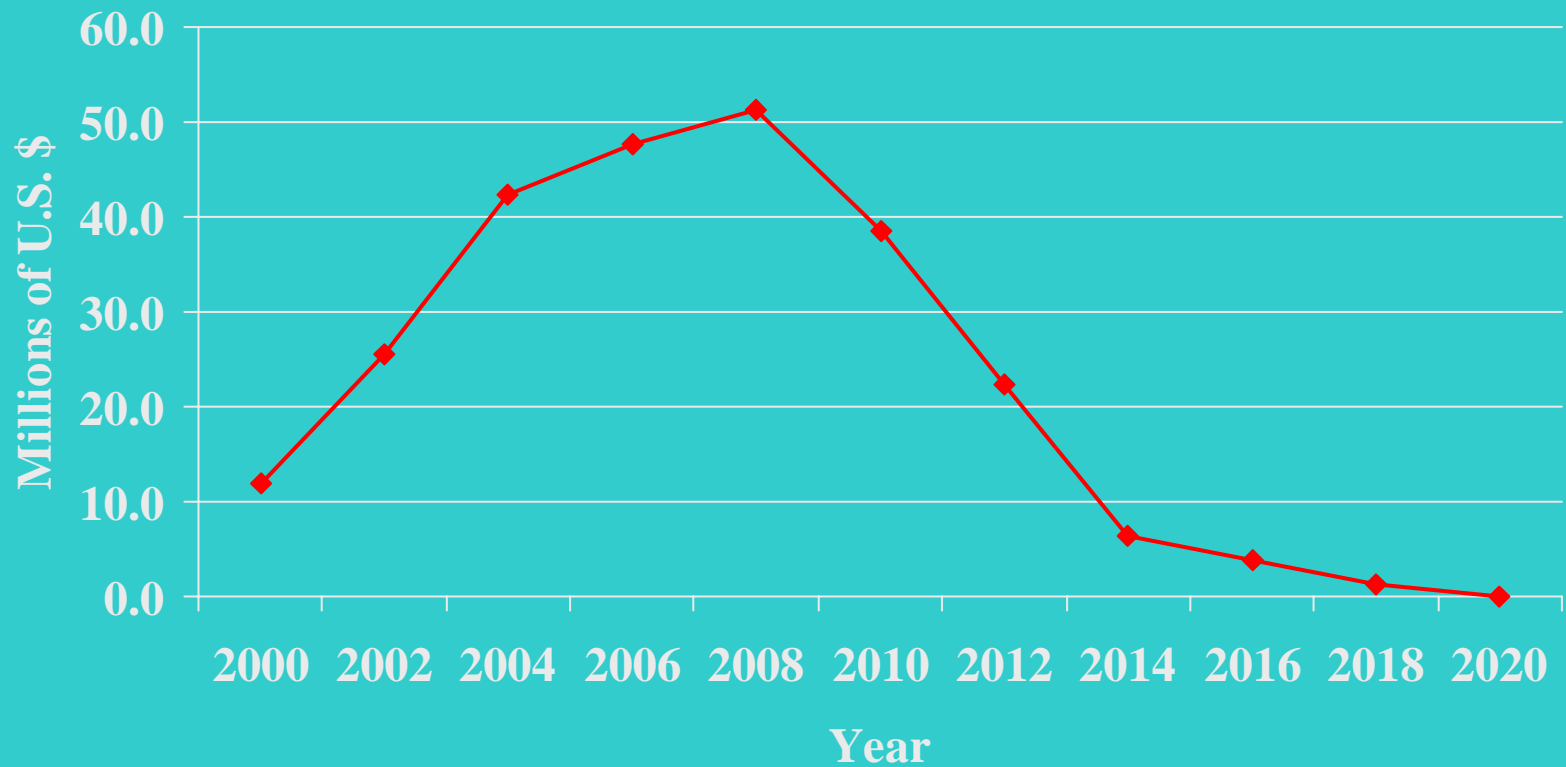
**Total Annual Losses: \$1.3 billion U.S.**



# Decrease in Prevalence of LF Conditions



# Program Costs





# Costs, Benefits, and Economic Rate of Return

◆ Time period	2000 – 2029
◆ Total Costs	\$673 million
◆ Total benefits	\$11 billion
◆ ERR	27%



# Economists Have a Critical Role in EID

- ◆ Model alternative scenarios of transmission
- ◆ Project potential economic impact
- ◆ Forecast impact on health care infrastructure
- ◆ Assist in planning for potential events
- ◆ Determine if interventions are effective and cost effective